ISO 55001 in Brazil: why few companies are practicing the standard?

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Abstract

Effective and efficient organizations use their asset management to resolve competing priorities and ensure that long-term benefits are not sacrificed for immediate needs. Implementing ISO 55001 allows organizations to lead their operations orderly, creating value and improving their results and income. In Brazil, however, the standards are still little known and used by companies. On the ISO website about organizations certified with the 55001, only eight Brazilian companies appear on the list. Regardless that linking asset management to corporate strategy is relatively new, Brazilian companies have not been accumulating achievements with this standard. Therefore, through a survey with experts and open interviews with consultants in the area, this study seeks to answer why asset management standards have little adherence in Brazil. This research suggests that the main reason for the standards' non-accession is that the Brazilian companies have a culture of immediacy. Any process that will generate results in the medium and long term is not always a priority since the daily demands in the short time are very high, taking up all the employees' working time. So, the companies cannot deliver sustainable results.

Keywords
ISO 55001, Asset management, Sustainable results, Brazilian companies, Culture of immediacy.

1. Introduction
Studies have shown the asset management efficiency in companies from different sectors. Implementing ISO 55001 allows organizations to handle all their operations systematically. At the same time, this work perspective provides the data needed to improve asset operations and continually analyze the causes of failures. Better asset performance enhances the organization's ability to offer more reliability and higher quality products/services with shorter delivery times. Thus, improving their results and income (Alsyouf et al., 2018). Even though asset management activity has been developing alongside human development (Hastings, 2015), the formalization and standardization of these

activities are only from this century (Wijnia et al., 2016). The publication of standards and specifications was disruptive to asset management. It innovated managing productive machinery and equipment by standardizing an activity as old as the assets themselves (Panegossi and Silva, 2021).

In addition to the improvement and effectiveness of the assets, improved financial performance, and improved outputs and services, the benefits that AM can bring are informed investment decisions, managed risk, improved social responsibility, demonstrated compliance, improved image, and enhanced organizational sustainability (ISO, 2014). Moreover, a good AM is a key enabler for organizations seeking to contribute to achieving the United Nations' Sustainable Development Goals (SDG) (ISO, 2020). AM improves an organization's sustainability by effectively managing costs and activities to achieve both short- and long-term intended impacts, including the sustainability of operations and performance. Additionally, AM processes demonstrate social responsibility and ethical business practice by improving the ability to reduce emissions, conserve resources and adapt to climate change (ISO, 2018). In Brazil, however, the term "asset management" and the technical standards are still little known by companies.

1.1 Objectives

Hence, this research explores why asset management standards have slight accession in Brazil through a survey with experts and open interviews with consultants**.** The results and conclusions, as well as the bibliographic research, are described in the following sections.

2. Literature Review

Although the development of physical assets has been one of the symbols of human activity since its emergence of physical assets, managing physical assets has never been an activity well understood by the general population (Hastings, 2015). Organizations have managed assets for decades, and managers have always wondered if they were doing it effectively, like: do we have the right assets? Are they what we need now, and what will they do in the future? What if they fail? How much do they cost us to operate? What is the risk level considering our critical assets? How can new technologies and stakeholder expectations affect practices related to them? (Hodkiewicz, 2015; Konstantakos et al., 2019)

Asset Management (AM) terminology is considered recent (Pais et al., 2019), and asset management is regarded as a new standard that emerged at the beginning of this century (Lafraia, 2020). As scientific research, asset management is relatively new, starting only in the late 1960s and early 1970s, as terotechnology. It has developed from tools and concepts to improve profitability through a more holistic and integral management system orientation, formalized by creating technical standards (Wijnia, 2016). The terotechnology concept emerged in the early 1970s in the United Kingdom in the same way and at the same time as TPM (Total Productive Maintenance) appeared in Japan (Farinha, 2018). Holistic is defined as the integral understanding of phenomena and not isolated analysis. With the evolution of several maintenance concepts and the development of new approaches and methodologies applied to quality and production, the maintenance activity began to be included and adapted to these new concepts. In this way, asset management cannot be seen as an individual activity or only a department since each decision can affect the entire organization (Pais et al., 2019). In the early 2000s, there were many practices, processes, and ideas around this subject; however, sharing this knowledge was complicated due to the use of different terms and definitions by different groups: technical societies, research groups, and different sectors, each promoting its vision of best practices (Hodkiewicz, 2015).

In response to the demand for alignment of these practices (Hodkiewicz, 2015) and the demand from industries for an AM standard, the PAS 55 specification was developed in 2004 under the leadership of the Institute of Asset Management (IAM) and revised in 2008 (PAS 55:2008), by the British Standard Institute (BSI) (ABRAMAN, 2011). The publication of PAS galvanized the AM community. With global interest in the content, BSI started translating PAS 55 into an ISO Standard (International Organization for Standardization) (Hodkiewicz, 2015). With ISO 55001, the AM topic jumped into the spotlight (Meireles, 2018), and its publication set in 2014 profoundly affected PAS 55, which will no longer be revised. It also altered the asset management systems, ushering in a new era of professional advancement, similar to the quality movement in the 1990s (Konstantakos et al., 2019). ISO 55001, unlike PAS 55, was born in line with other management standards, such as 9001 (Quality), 14001 (Environmental), and 31001 (Risk) (Lafraia, 2020). How it is aligned with these other ISO standards, 55001 can contribute to an organization developing a coherent set of management practices in all aspects of its activity (ISO, 2020). For that reason, the 55001 standards restored the way to manage assets, connecting technical data to economic data, the factory floor to the economic environment, and integrating its processes and activities with the organization's other functions. Moreover, the

standards integrate its management system with the quality, environmental, health and safety, and risk management systems (Panegossi and Silva, 2021).

Standardization is a consolidated technology with the reliability to reproduce specific procedures infinite times, whether in the industrial area, in-services, or management programs, with minimal possibilities of error. Furthermore, developing a technical standard means sharing knowledge and promoting competitiveness and project excellence in the economic, social, and environmental spheres (ABNT, 2011). So, the key benefits of adopting ISO 55001 are (ISO, 2018):

(i) **performance improvements:** effective and efficient management of short- and long-term opportunities improves sustainability, allowing the organization to meet or exceed the performance consistently and social responsibility expectations of stakeholders.
(ii) **cost improvements:** an AMS improves the asset value to advance the bottom line and facilitates improved return on investment and cost reduction metrics without sacrificing short or long-term organizational performance.
(iii) **management of risk:** the ongoing review of processes, procedures and asset performance enables informed management decisions that balance cost, risk, and performance data to improve organizational efficiency and effectiveness.
(iv) **assurance of business growth and improvement:** a robust AMS aids improvements with formal, collaborative, prioritized, and coordinated implementation plans that enable the entire organization to communicate and understand the objectives and commitments.
(v) **reliable decision making** implementing an AMS drives reliable decision making for the development, coordination, and control of asset-related activities; and aligns these activities with core corporate objectives.
(vi) **enhances stakeholder confidence through compliance and improved reputation:** the standard supports a clear policy and strategy that maintains and continuously improves the AMS and demonstrates alignment with other management systems.

The key benefits of adopting ISO 55001 are described in Figure 1.

Figure 1 – Key benefits of adopting ISO 55001
Source: ISO, 2020.

When considering the business process perspective, implementing the standard improves documentation, work procedures, policies, and records, allowing the organization to handle all its operations systematically. Concurrently, this perspective will provide all the data needed to profoundly improve asset operations and analyze all causes of errors, failures, non-conformities, rework, and non-value-added activities. Consequently, the performance of the maintenance department will enhance and affect the organization's ability to provide more reliability and higher quality products and services with shorter lead times. These results will increase sales and revenues, improving its return on investment (ROI) (Alsyouf et al., 2018).

In work by (Capela et al., 2020). the implementation of the 55001 allowed the study company to

(i) alignment of the AM function with the other functions of the company (operational and financial);
(ii) identify the assets and their components, making it more explicit whether their replacement would become capital or operating expense.
(iii) align information systems with extracting information on the performance and cost of assets: the financial record ERP, the maintenance management system, the geographic information system, the customer management system, the condition assessment information system, and the various Excel spreadsheets where operational information was recorded.
(iv) monitoring cost, performance, and risk indicators supporting asset managers in the decision-making.

For companies whose business is based and depends on their assets' operation, ISO 55001 introduces innovation in terms of the asset's life cycle. And not only limited to the period between acquisition and disposal but understood from when there is a need to develop a specification for a new asset until the end of its use (Zampolli et al., 2019). Although

the physical assets' life cycle depends on several factors, the standard brings requirements that, if and when implemented and maintained, ensure the asset management performance, responding to stakeholders' needs and expectations, and value creation. An organization that is ISO 55001 certified is obviously at the forefront of lifecycle optimization because it is part of its requirements (Pais et al., 2020). However, ISO 55001 certification only guarantees compliance with regulatory requirements and not excellence in AM. Regulatory requirements are good practices that, if properly applied, will create value for stakeholders (Lafraia, 2016). Achieving excellence in AM is critical to increasing return on investment in active-intensive companies or companies that depend on assets to establish their business. And ISO 55001 is practiced by those seeking business excellence (ICA, 2018).

Achieving excellence in AM is also a crucial enabler for organizations seeking to contribute to achieving the United Nations (UN) SDG since AM provides clarity of purpose and ensures that good intentions are turned into practical reality (ISO, 2018). The UN adopted the 2030 Agenda for Sustainable Development in 2015, which contains 17 SDGs, an urgent call for action by all developed and developing countries in a global partnership. They englobe strategies that improve economic growth all while working to preserve our planet (United Nations, 2022). A good AM inherently contributes to seven of the SDGs (ISO, 2018):

(i) clear water and sanitation.
(ii) affordable and clean energy.
(iii) decent work and economic growth.
(iv) industry innovation and infrastructure.
(v) sustainable cities and communities.
(vi) responsible consumption and production.
(vii) climate action.

Figure 2 shows an example of alignment between SDG and AM principles.

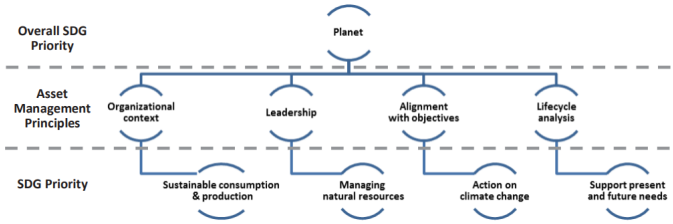

Figure 2 – Example alignment between SDG and AM principles.
Source: ISO, 2018.

An AMS based on ISO 55001 helps an institution align the organization's Corporate Social Responsibility (CSR) goals with daily activities and processes. Incorporating CSR goals that acknowledge the SDG into its value framework ensures that the AMS includes the latter as success criteria. AM realizes value by optimizing combinations of financial, environmental, social impact, risk management, quality of service, and performance criteria throughout an asset's life. There is a natural alignment between the core principles of good AM and the desires represented in the UN's SDG. This alignment extends to the practical delivery framework and the integration of CSR objectives within other organizational strategic goals (ISO, 2018).

Figure 3 illustrates AM fundamentals that enable organizations to meet their CSR goals and SDG outcomes.

Figure 3 – AM enablers for the success of SDG.
Source: ISO, 2018.

On the ISO website (ISO, 2022), there is a report about the 324 organizations worldwide certified with 55001, although it is suspect there are many more. It is known that there are ten companies certified by ISO 55001 in Brazil: AES Brazil, Enel Energy, China Three Gorges Corporation, Investco (Lajeado Hydroelectric Power Plant), Pecém Port Power Generation, Data Center of Brazilian Bank, Beneficiencia Portuguesa Hospital, Ocyan Petroleum, Hydro Alunorte, and Syngenta. Five companies are in electricity, one in facilities management, one in health services, one in oil and gas, one in mining, and one in the chemical sector. Still, only eight are listed on the ISO website. AES Brazil, the precursor company, which achieved certification in 2015, reports becoming a pioneer in the electricity sector (AES, 2020). The Hospital, one of Latin America's most important private health centers, was the first in the health sector and the second institution in the country to obtain the ISO 55001 certification. With the formalization of AM, services tend to become more agile and efficient, as there is a significant reduction in the number of times equipment undergoes maintenance. As a result, equipment availability increases, and interruptions, when necessary, are all programmed, impacting the operation (ANAHP, 2017).

Figure 4 shows certification statistics by country/region (about the 324 organizations worldwide are certified with 55001).

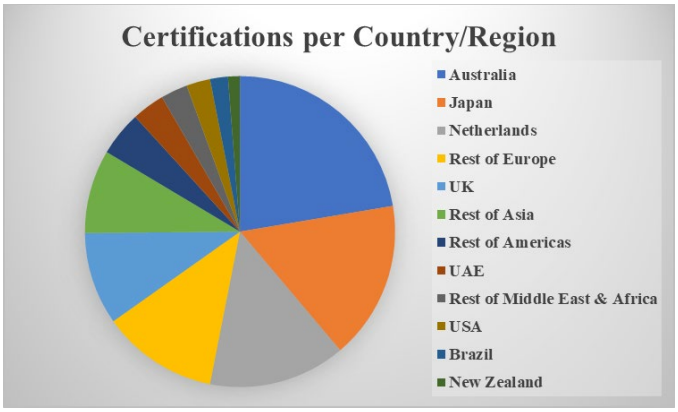

Figure 4 – Certifications per Country/Region
Source: Prepared by the authors (based on the information from ISO, 2022).

Figure 5 shows certifications by industry (about the 324 organizations worldwide are certified with 55001).

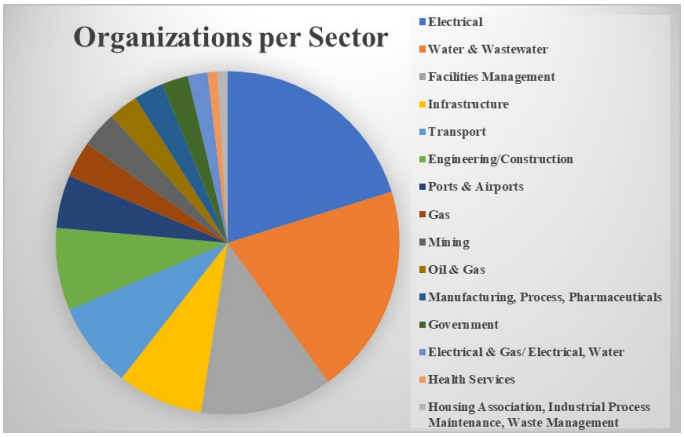

Figure 5 – Certifications per Sector
Source: Prepared by the authors (based on the information from ISO, 2022).

In Brazil, the body responsible for translating and publishing standards is ABNT (Brazilian Association of Technical Standards), whose CEE-251 (Special Study Committee) is a mirror of ISO/TC 251 (ISO Technical Committee for AM) (ABNT, 2022). Most organizations use the ISO series of management systems for "third party" certification. Third-party certification is done by independent and recognized companies or organizations such as Company Certification Bodies (CCB) that undertake a comprehensive audit of the organization's AMS and provide a certificate

of approval of its compliance and effectiveness. These entities responsible for making third-party certifications are accredited by the Accreditation Bodies (AB), which in the case of Brazil is INMETRO (National Institute of Metrology, Standardization, and Industrial Quality). The CCBs are audited and registered by the AB (Lafraia, 2016). In response to an email sent by the author, INMETRO positioned itself that, to date (2022), it still does not provide data from certifiers and bodies accredited to the ISO 55001 standard.

Thus, this research seeks to understand why, even with so many benefits, the reasons asset management, through 55001, is not expressive in Brazil. The leading causes and difficulties are described in the next section due to the questionnaire sent to specialists and open interviews with field consultants.

3. Methods

This research method can be considered a Survey, as the researchers wanted to investigate a problem whose answer depended on people's information. For the elaboration of this study, research was carried out in books, technical standards, books, and scientific articles available in electronic journals - through search engines such as Scopus, Scielo, and Google Scholar. In addition, the survey had sent to asset maintenance and management groups and communities in Brazil via email and social and professional networks. As a result, some consultants in the area received it. However, they could not answer it as their consulting firms only count human assets, not industries. Thus, some of them were willing to discuss why 55001 has little adherence in Brazil.

5. Results and Discussion

5.1 Survey

Of the companies participating in the survey: 48% are from São Paulo, the most developed state and the country's financial, cultural, and industrial center; 12% are from Rio de Janeiro; 8% are multi-state; 32% belong to the various Brazilian states. Figure 6 brings statistics from Brazilian State.

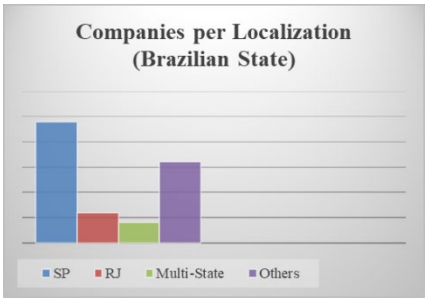

Figure 6 – Companies per Localization (Brazilian State)

Figure 7 shows the statistics by sector, from the form options (metal-mechanical, chemical, electronic equipment, food, textile, furniture, cosmetics, and others).

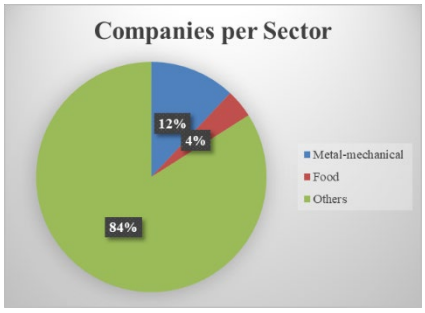

Figure 7 – Companies per Sector

Figure 8 is about if the capital investment in production equipment is significant (64% of companies answered yes).

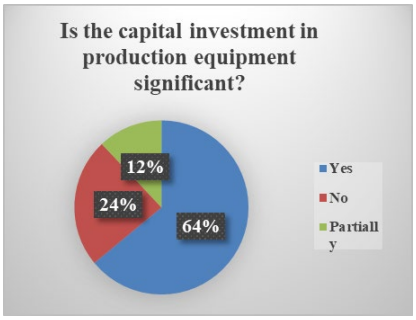

Figure 8 – Is the capital investment in production equipment significant?

Figure 9 reflects if the industrial equipment productivity is fundamental to the company's competitive capacity **(**68% answered yes).

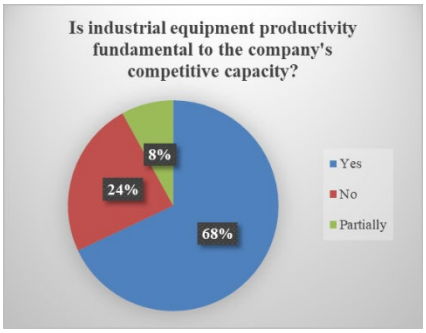

Figure 9 – Is industrial equipment productivity fundamental to the company's competitive capacity?

Figure 10 demonstrates if the production asset is the asset that generates revenue and sustains all other company assets **(**72% answered yes).

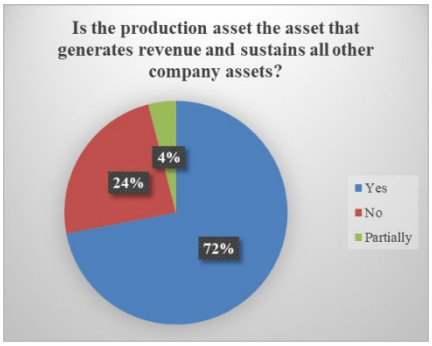

Figure 10 – Is the production asset the asset that generates revenue and sustains all other company assets**?**

However, when asked if the productivity of industrial equipment (factory floor) is monitored, only 28% responded: "yes, for all equipment". Figure 11 presents that.

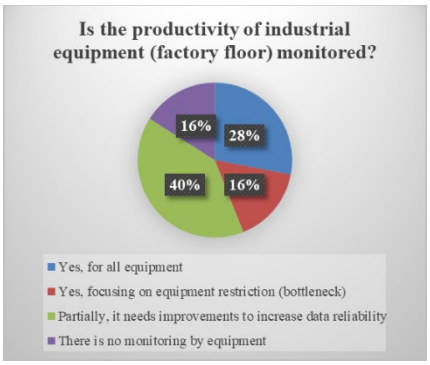

Figure 11 – Is the productivity of industrial equipment (factory floor) monitored?

Moreover, when asked if the company has a clear AM policy, only 32% said: "yes, there is a clear policy that is used to direct all actions concerning assets". Figure 12 exhibits that.

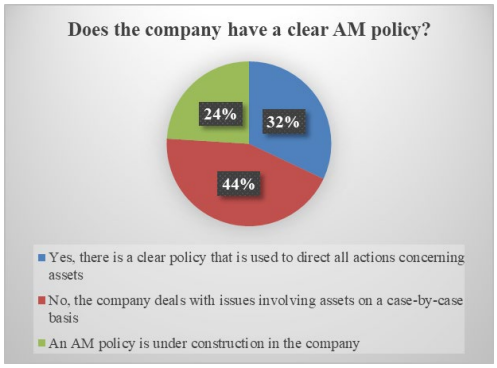

Figure 12 – Does the company have a clear AM policy?

Figure 13 shows how long companies that answered yes (32%) have a clear AM policy. However, 4% of those with AM policy did not respond.

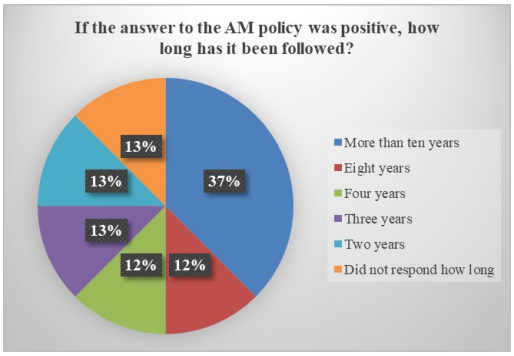

Figure 13 – How long has AM policy been followed?

Among companies whose AM policy is under construction (24%), just 4% responded that the building has been occurring for one year.

Figure 14 presents the question results "if, with the execution of the coordinated AM activities, it was possible to identify the value realization (balance between costs, performance, and risks)" done to the companies with an AM clear policy (32%).

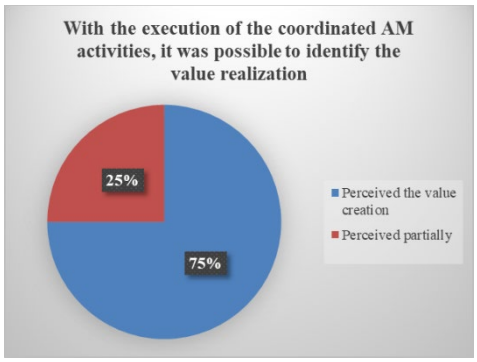

Figure 14 – Value creation in companies with a clear AM policy

Figure 15 is about value creation in companies whose policy is under construction (24%).

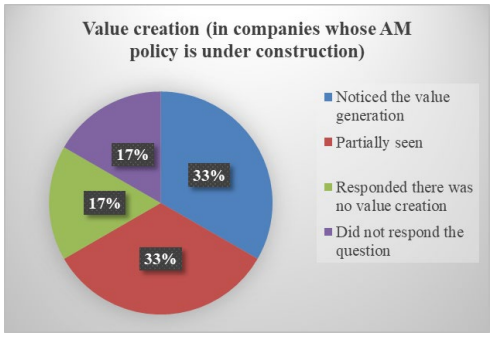

Figure 15 – Value creation in companies whose AM policy is under construction

Of the participating companies, Figure 16 shows if companies already knew ISO 55001 standard.

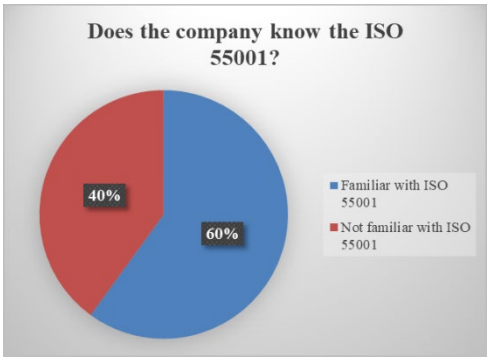

Figure 16 – Do the companies know the ISO 55001?

Of the participating companies, Figure 17 shows if the companies already had a management system.

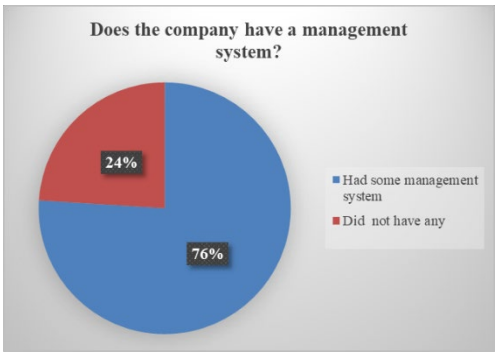

Figure 17 – Do the companies have a management system?

Of the participating companies, Figure 18 displays if the companies had procedures that assisted AM.

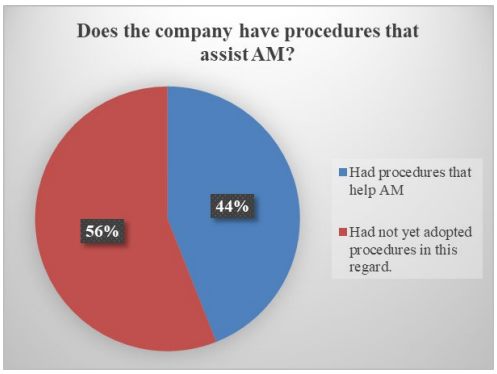

Figure 18 – Do the companies have procedures that assist AM?

Five people from four companies that answered the form **are certified with ISO 55001.** Two people work in the same company but in different subsidiaries. In research of certifications 55001 in Brazil, only three are certified and not four. Then, these answers will be considered, with attention to the company whose form was filled in by two employees who answered samely the questions.

The three companies are from the energy sector. The three **chose a certification body to implement the standard requirements**. **Of the most important criteria (cost, quality, agility, trust) for selecting the certifier**: one company responded "confidence", one company responded "quality", and the other did not mention the criterion.

If the company had difficulty finding a certifier: two answered "no difficulty," and one answered, "great difficulty".

How/where the company sought information/references about certifiers, from options: information from other companies, information on the internet (sites, news, advertisements), and others; the three companies answered "others".

When asked if the company researched information/references from ISO 55001 certifiers on the INMETRO website, one answered yes, and two answered no. However, the three companies knew **that INMETRO still does not provide information on ISO 55001 certifiers**.

Of the companies that are **not certified and intend to be certified**, only 10% have **already started to fulfill the** requirements and chose **to do it internally** instead **hired a certifier**. All other companies participating in the survey showed no interest in adhering to the standard.

Finally, to answer the initial question and the title of this research, it asked these **c**ompanies if, although they practice AM and do not intend to be specifically certified with the ISO 55001 standard, what is the main reason**.**

Figure 19 shows the question results from the options: the company does not see the need, at the moment, to seek this certification; due to the low adherence to this standard by Brazilian companies; lack of knowledge of the norm by the

stakeholders; due to the little prospect of financial return with this certification; lack of recognition of the standard by INMETRO; and others.

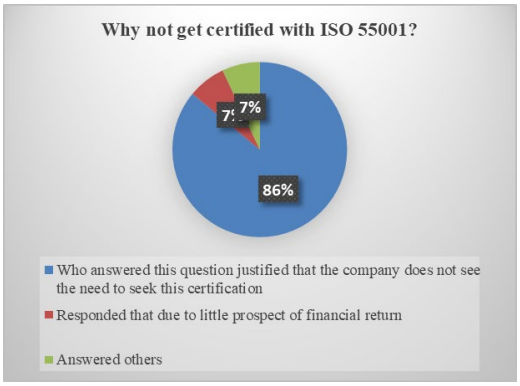

Figure 19 – The reasons to not get certified with ISO 55001

Nevertheless, why do companies see no need for this certification? For this, the authors talked to consultants in the area.

5.2 Open Interviews

The factors presented by consultants in the field were: two groups work in favor of AM but with different objectives. One aims at ISO 55001 certification, and the other focuses only on improving AM processes. These groups are quite different. Consultants from other ISO standards form one group, and maintenance area professionals form another. Maintenance professionals who do not know or are not familiar with the 55001 focus only on good maintenance practices. On the other hand, maintenance professionals who understand the standard do not feel comfortable preparing the company for certification.

ISO 55001 consultants, on the other hand, assess that non-adherence to the standard was impacted by the situations:

- In maintenance, major projects have a long sales cycle. Short-term cycles are only valid for expenses that directly affect production assets. "Small" projects, as a certification, are sold at the end of the year, using budget leftovers.
- The standard was launched in 2014. Therefore, in an optimistic scenario, own 2014 would be the year of disclosure to the market.
- 2015 would be the year for companies to obtain budgets for the implementation that would take place in 2016.
- However, the years 2015, 2016, 2017, and 2018 were troubled years in Brazil due to political crises, which generated uncertainties, and there was little investment in the country.
- 2019 started uncertainly but seemed to be returning to normality.
- In 2020 and 2021, the consulting market stopped. Certification contracts have been suspended and/or canceled.
- Unlike ISO 9001, which qualifies suppliers, 55001 has no commercial appeal, although it encompasses customer needs and expectations.
- Furthermore, another difficulty that co-occurred was that INMETRO decided that it was not a priority to have certifying companies installed in Brazil for such certification.

6. Conclusion

This research was specially formulated for companies whose physical assets represent the revenue-generating infrastructure. They are the assets that support the organization and, therefore, are essential to the ability to remain competitive. However, the survey shows that many participating companies do not have a clear AM policy, do not have procedures that help AM, or know the standard that could help them start activities to manage their assets better. Many professionals in the area do not even know the standard. Then, despite linking AM to corporate strategy is relatively new, Brazilian companies have not been accumulating achievements with the standard implementation and

the adjacent benefits of this achievement. Like the TPM, introduced in the Brazilian market via the maintenance department, 55001 will have many difficulties integrating processes with other sectors. Therefore, compared with international references, the results are not achieved.

The main reason for the standard's non-adoption and consent is that the Brazilian entrepreneurs have a culture of immediacy. Any process that will generate medium- and long-term results is not always a priority. Companies do not have solid and organized strategies to support AM since daily demands are very high and take up all the employees' time. Thus, people cannot organize themselves to deliver a sustainable result, the opposite expected by AM. Instead, effective and efficient organizations use their AM to resolve competing priorities and ensure that long-term benefits are not sacrificed for more immediate needs. In Brazil, ISO 55001 is far from the enthusiasm and success promoted by ISO 9001.

As the survey was designed especially for manufacturing companies, many professionals did not want to answer it because they understood that their company did not align with the research. So then, there is a suggestion for a complete survey, a specific study for consultants, and another for ISO 55001 certified companies.

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